

CRTE POWER CAPASITORS

In its power factor correction systems, VMtec uses only capacitors entirely made within the facilities of its group. This way, VMtec guarantees the greater quality of the finished product.

The film used in the CRTE power capacitors comes directly from the VMtec experience in the high performance capacitors, in particular it is defined as

"High density ( type) metallized polypropylene film".


: High density metallized polypropylene film capacitor s

The main difference in comparison to standard polypropylene capacitors is the way in which the dielectric film is metallized.

In standard polypropylene capacitors the thickness of the metal layer deposited on the film surface is constant; in 1995, instead, VMtec has developed a manufacturing process that enables obtaining a metal layer with properly modulated thickness and achieving extraordinary results in the capacitors field for direct current and energy accumulation applications.

Subsequently this technology has been extended to capacitors for alternating current applications, with same remarkable results in power factor correction of industrial facilities.

The modulation of the metallization thickness, considerably better capacitors performances (and therefore the one of the power factor corrector systems of which they are the basic component) in terms of:

- increased specific power (kvar/dm³) with resulting reduction of power factor corrector systems dimension;
- improvement of the strengthens to continuous and temporaries overvoltage for a better reliability even in plants with voltage peaks due to the network or manoeuvres on the plant;  capacitors are in fact tested at three times the rated voltage (type test) from which procedure comes their name;
- better reaction to the internal short circuit thanks to the special metallization with changeable thickness

GENERAL DESCRIPTION

CRTE is the VMtec last generation of metallized polypropylene film capacitors to be used for power factor correction and harmonic filtering in low voltage plants.

The main features are:

- Three phase windings delta connected in a cylindrical aluminium case;
- Rated power from 2,5kvar up to 40kvar;
- Rated voltage from 230V up to 800V;
- Rated frequency 50 / 60 Hz;
- Terminal board;
- Reduced mounting cost for terminal board connections;
- 100.000 hours service life design;
- Dry, environment friendly construction;
- Suitable for any mounting position (vertical preferable for better cooling);
- Indoor installation;
- Quality system in accordance with ISO 9001 standard.

Applications

- Individual fixed Power Factor Correction for motors, low voltage transformers, etc;
- Low voltage automatic Power Factor Correction Capacitor Banks;
- Low voltage detuned/tuned Capacitor Banks.

Safety

- Self-healing design;
- Over pressure safety device which prevents the capacitor from explosion at the end of its service life;
- Dry technology: as the capacitor is filled with resin, there is no risk of leaking oil or gas;
- Touch proof terminals for terminal board design (IP20 protection degree).



Environment safety

- PCB free.

Damping of Inrush Current

Capacitors used for power factor correction have to withstand a lot of switching operations. The switching of a capacitor in parallel with energized capacitor banks, produces extremely high inrush currents and voltage transients.

The connection of a low voltage power factor correction capacitor without damping to an AC power supply, could lead to a reduced lifetime. For this reason, capacitors should be protected during the switching operation by means of suitable contactors equipped with damping resistors.

Harmonics

Harmonics are sinusoidal voltages and currents with multiple frequencies of the 50 or 60 Hz line frequency. In presence of harmonics the resonance phenomena can be avoided by connecting capacitors in series with reactors (detuned filters).

Components for detuned filter must be carefully selected (see next chapter). Particular care has to be taken for capacitors because the voltage across them will be higher than the nominal voltage when they have a reactor in series.

Discharging

Capacitors must be discharged in 3 minutes to 75V or less. There shall be no switch, fuse or anyother isolating device between the capacitor unit and the discharging device. VMtec supplies capacitor discharge resistors to all series.

TECHNICAL DATE SHEETS AND TABLES

| TECHNICAL CHARACTERISTICS | | |
|-------------------------------------|--|--|
| • Dielectric | polypropylene metallized film | • Voltage test terminals/case |
| • Winding connection | delta | 3000V, 50Hz, 10 seconds |
| • Safety device | Internal overpressure disconnecter | • Dielectric losses |
| • Capacitance tolerance | -5%, +10% | < 0.2 W/kvar |
| • Rated Voltage | 230V, 400V/415V, 450V, 480V/525V, 690V, 750V, 800V | • Temperature class |
| • Rated Frequency | 50 Hz | -25/D |
| • Over voltages | According to IEC | • Cooling |
| • Un + 10% (up to 8 hours daily) | | Natural air of forced ventilation |
| • Un + 15% (up to 30 minutes daily) | | • Permissible humidity |
| • Un + 20% (up to 5 minutes daily) | | 95% |
| • Un + 30% (up to 1 minute daily) | | • Service life |
| • Over current | 2 In (including harmonics) | 100.000 operating hours |
| • Maximum inrush current | 200 In | • Altitude above sea level |
| • Insulation level | 3 / 15 kV | 2000 m |
| • Voltage test between terminals | 2,15 Un, 50Hz, 10 seconds (routine test) | • Impregnation |
| • Voltage test between terminals | 3,00 Un, 50Hz, 60 seconds (type test) | resin filled, PCB free |
| | | • Terminals |
| | | Terminal board |
| | | • Fixing and Ground |
| | | Threaded M12 stud on case bottom |
| | | • Mounting position |
| | | vertical preferable for better cooling |
| | | • Protection degree |
| | | IP20 |
| | | • Installation |
| | | Indoor |
| | | • Discharge resistors |
| | | Included |
| | | • Discharge time |
| | | < 3 minutes to 75V or less |
| | | Applicable standards |
| | | IEC 60831-1/2 |

Vn = 230V - 50Hz - Fi = 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T233100156V00 | CR T-56V-1-230 | 1 | 3 x 20 | 3 x 2,5 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T233150156V00 | CR T-56V-1,5-230 | 1,5 | 3 x 30,1 | 3 x 3,8 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T233200166V00 | CR T-66V-2-230 | 2 | 3 x 40,1 | 3 x 5 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T233250166V00 | CR T-66V-2,5-230 | 2,5 | 3 x 50,1 | 3 x 6,3 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE601233M60059 | CR TE08520805023 | 5 | 3 x 100 | 3 x 12,6 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE901233M60060 | CR TE10020807523 | 7,5 | 3 x 150 | 3 x 18,9 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE122233M60031 | CR TE10020810023 | 10 | 3 x 200 | 3 x 25,2 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE152233M60032 | CR TE11620812523 | 12,5 | 3 x 250 | 3 x 31,5 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE182233M60186 | CR TE13620815023 | 15 | 3 x 300 | 3 x 37,6 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |

Vn = 400V (415V) - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T403100156V00 | CR T-56V-1-400 | 1 | 3 x 6,6 | 3 x 1,4 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403150156V00 | CR T-56V-1,5-400 | 1,5 | 3 x 9,9 | 3 x 2,2 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403200156V00 | CR T-56V-2-400 | 2 | 3 x 13,3 | 3 x 2,9 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403250156V00 | CR T-56V-2,5-400 | 2,5 | 3 x 16,6 | 3 x 3,6 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403300166V00 | CR T-66V-3-400 | 3 | 3 x 19,9 | 3 x 4,3 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T403400166V00 | CR T-66V-4-400 | 4 | 3 x 26,5 | 3 x 5,8 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T403500166V00 | CR T-66V-5-400 | 5 | 3 x 33,2 | 3 x 7,2 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE501403M50028 | CR TE07520805040 | 5 | 3 x 33,2 | 3 x 7,2 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751403M50033 | CR TE07520807540 | 7,5 | 3 x 49,7 | 3 x 10,8 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE102403M50053 | CR TE08520810040 | 10 | 3 x 66,3 | 3 x 14,4 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE1D2403M50036 | CR TE08520812540 | 12,5 | 3 x 82,9 | 3 x 18 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE152403M50054 | CR TE10020815040 | 15 | 3 x 99,5 | 3 x 21,7 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE202403M50001 | CR TE10020820040 | 20 | 3 x 132,6 | 3 x 28,9 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE252403M50002 | CR TE11620825040 | 25 | 3 x 165,8 | 3 x 36,1 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE302403M50003 | CR TE11620830040 | 30 | 3 x 198,9 | 3 x 43,3 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE402403M50108 | CR TE13628340040 | 40 | 3 x 265,4 | 3 x 57,7 | 136 | 283 | 3,8 | 2 | 370x370x125 | External |

Vn = 450V - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T453100156V00 | CR T-56V-1-450 | 1 | 3 x 5,2 | 3 x 1,3 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T453150156V00 | CR T-56V-1,5-450 | 1,5 | 3 x 7,9 | 3 x 1,9 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T453200156V00 | CR T-56V-2-450 | 2 | 3 x 10,5 | 3 x 2,6 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T453250156V00 | CR T-56V-2,5-450 | 2,5 | 3 x 13,1 | 3 x 3,2 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T453300166V00 | CR T-66V-3-450 | 3 | 3 x 15,7 | 3 x 3,8 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T453400166V00 | CR T-66V-4-450 | 4 | 3 x 21 | 3 x 5,1 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T453500166V00 | CR T-66V-5-450 | 5 | 3 x 26,2 | 3 x 6,4 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE501453M50015 | CR TE07520805045 | 5 | 3 x 26,2 | 3 x 6,4 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751453M50034 | CR TE07520807545 | 7,5 | 3 x 39,3 | 3 x 9,6 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE102453M50055 | CR TE08520810045 | 10 | 3 x 52,4 | 3 x 12,8 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE1D2453M50037 | CR TE08520812545 | 12,5 | 3 x 65,5 | 3 x 16 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE152453M50056 | CR TE10020815045 | 15 | 3 x 78,6 | 3 x 19,2 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE202453M50010 | CR TE10020820045 | 20 | 3 x 104,8 | 3 x 25,7 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE252453M50004 | CR TE11620825045 | 25 | 3 x 131 | 3 x 32,1 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE302453M50009 | CR TE11620830045 | 30 | 3 x 157,2 | 3 x 38,5 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE402453M50162 | CR TE13628340045 | 40 | 3 x 209,7 | 3 x 51,3 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |

CRTE POWER CAPASITORS

TECHNICAL DATE SHEETS AND TABLES

Vn = 525V - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Heigh (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|------------------|----------------|-----------------|----------------|-----------------|--------------|-------------|---------|----------------|--------------------|
| CR T523100156V00 | CR T-56V-1-525 | 1 | 3 x 3,8 | 3 x 1,1 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523150156V00 | CR T-56V-1,5-525 | 1,5 | 3 x 5,8 | 3 x 1,6 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523200156V00 | CR T-56V-2-525 | 2 | 3 x 7,7 | 3 x 2,2 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523250156V00 | CR T-56V-2,5-525 | 2,5 | 3 x 9,6 | 3 x 2,7 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523300166V00 | CR T-66V-3-525 | 3 | 3 x 11,5 | 3 x 3,3 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T523400166V00 | CR T-66V-4-525 | 4 | 3 x 15,4 | 3 x 4,4 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T523500166V00 | CR T-66V-5-525 | 5 | 3 x 19,2 | 3 x 5,5 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE501523M50016 | CR TE07520805052 | 5 | 3 x 19,2 | 3 x 5,5 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751523M50035 | CR TE07520807552 | 7,5 | 3 x 28,9 | 3 x 8,2 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE102523M50057 | CR TE08520810052 | 10 | 3 x 38,5 | 3 x 11 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE1D2523M50038 | CR TE08520812552 | 12,5 | 3 x 48,1 | 3 x 13,7 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE152523M50058 | CR TE10020815052 | 15 | 3 x 57,7 | 3 x 16,5 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE202523M50021 | CR TE10020820052 | 20 | 3 x 77 | 3 x 22 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE252523M50022 | CR TE11620825052 | 25 | 3 x 96,2 | 3 x 27,5 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE302523M50023 | CR TE11620830052 | 30 | 3 x 115,5 | 3 x 33 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE402523M50079 | CR TE13620840052 | 40 | 3 x 154 | 3 x 44 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |

Vn = 690V - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Heigh (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|-----------------|------------------|----------------|-----------------|----------------|-----------------|--------------|-------------|---------|----------------|--------------------|
| CRE501693M50163 | CR TE07520805069 | 5 | 3 x 11,1 | 3 x 4,2 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751693M50164 | CR TE08520807569 | 7,5 | 3 x 16,7 | 3 x 6,3 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE102693M50165 | CR TE10020810069 | 10 | 3 x 22,3 | 3 x 8,4 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE1D2693M50166 | CR TE10020812569 | 12,5 | 3 x 27,9 | 3 x 10,5 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE152693M50167 | CR TE11620815069 | 15 | 3 x 33,4 | 3 x 12,5 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE202693M50168 | CR TE11620820069 | 20 | 3 x 44,6 | 3 x 16,7 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE252693M50111 | CR TE13620825069 | 25 | 3 x 55,7 | 3 x 20,9 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |
| CRE302693M50006 | CR TE11628330069 | 30 | 3 x 66,9 | 3 x 25,1 | 116 | 283 | 3,2 | 3 | 370x370x125 | External |
| CRE402693M50169 | CR TE13628340069 | 40 | 3 x 89,2 | 3 x 33,5 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |

Vn = 750V - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Heigh (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|-----------------|------------------|----------------|-----------------|----------------|-----------------|--------------|-------------|---------|----------------|--------------------|
| CRE501753M50170 | CR TE07520805075 | 5 | 3 x 9,4 | 3 x 3,8 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751753M50171 | CR TE08520807575 | 7,5 | 3 x 14,1 | 3 x 5,8 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE102753M50172 | CR TE10020810075 | 10 | 3 x 18,9 | 3 x 7,7 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE1D2753M50173 | CR TE11620812575 | 12,5 | 3 x 23,6 | 3 x 9,6 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE152753M50174 | CR TE11620815075 | 15 | 3 x 28,3 | 3 x 11,5 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE202753M50175 | CR TE13620820075 | 20 | 3 x 37,7 | 3 x 15,4 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |
| CRE252753M50042 | CR TE11628325075 | 25 | 3 x 47,2 | 3 x 19,2 | 116 | 283 | 3,2 | 3 | 370x370x125 | External |
| CRE302753M50176 | CR TE13628330075 | 30 | 3 x 56,6 | 3 x 23,1 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |
| CRE352753M50177 | CR TE13628335075 | 35 | 3 x 66 | 3 x 26,9 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |

Vn = 800V - 50Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Heigh (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|-----------------|------------------|----------------|-----------------|----------------|-----------------|--------------|-------------|---------|----------------|--------------------|
| CRE501803M50178 | CR TE08520805080 | 5 | 3 x 8,3 | 3 x 3,6 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE751803M50044 | CR TE10020807580 | 7,5 | 3 x 12,4 | 3 x 5,4 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE102803M50179 | CR TE10020810080 | 10 | 3 x 16,6 | 3 x 7,2 | 100 | 208 | 2,6 | 3 | 370x370x106 | External |
| CRE1D2803M50180 | CR TE11620812580 | 12,5 | 3 x 20,7 | 3 x 9 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE152803M50181 | CR TE13620815080 | 15 | 3 x 24,9 | 3 x 10,8 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |
| CRE202803M50182 | CR TE13620820080 | 20 | 3 x 33,2 | 3 x 14,4 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |
| CRE252803M50183 | CR TE13628325080 | 25 | 3 x 41,5 | 3 x 18 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |
| CRE302803M50184 | CR TE13628330080 | 30 | 3 x 49,8 | 3 x 21,6 | 136 | 283 | 3,8 | 2 | 370x370x161 | External |

TECHNICAL DATE SHEETS AND TABLES

| TECHNICAL CHARACTERISTICS | |
|----------------------------------|--|
| • Dielectric | polypropylene metallized film |
| • Winding connection | delta |
| • Safety device | Internal overpressure e disconnector |
| • Capacitance tolerance | -5%, +10% |
| • Rated Voltage | 230V, 400V/415V, 450V, 480V/525V, 960V, 750V, 800V |
| • Rated Frequency | 60 Hz |
| • Over voltages | According to IEC |
| • | Un + 10% (up to 8 hours daily) |
| • | Un + 15% (up to 30 minutes daily) |
| • | Un + 20% (up to 5 minutes daily) |
| • | Un + 30% (up to 1 minute daily) |
| • Over current | 2 In (including harmonics) |
| • Maximum inrush current | 200 In |
| • Insulation level | 3 / 15 kV |
| • Voltage test between terminals | 2,15 Un, 50Hz, 10 seconds (routine test) |
| • Voltage test between terminals | 3,00 Un, 50Hz, 60 seconds (type test) |
| • Voltage test terminals/case | 3000V, 50Hz, 10 seconds |
| • Dielectric losses | < 0.2 W/kvar |
| • Temperature class | -25/D |
| • Cooling | Natural air of forced ventilation |
| • Permissible humidity | 95% |
| • Service life | 100.000 operating hours |
| • Altitude above sea level | 2000 m |
| • Impregnation | resin filled, PCB free |
| • Terminals | Terminal board |
| • Fixing and Ground | Threaded M12 stud on case bottom |
| • Mounting position | vertical preferable for better cooling |
| • Protection degree | IP20 |
| • Installation | Indoor |
| • Discharge resistors | Included |
| • Discharge time | < 3 minutes to 75V or less |
| • Applicable standards | IEC 60831-1/2 |

Vn = 230V - 60Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|---------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T233100156V00 | CR T-56V-1,2-230/60 | 1,2 | 3 x 20 | 3 x 3 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T233150156V00 | CR T-56V-1,8-230/60 | 1,8 | 3 x 30,1 | 3 x 4,5 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T233200166V00 | CR T-66V-2,4-230/60 | 2,4 | 3 x 40,1 | 3 x 6 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T233250166V00 | CR T-66V-3-230/60 | 3 | 3 x 50,1 | 3 x 7,5 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE601233M60059 | CR TE08520806023/60 | 6 | 3 x 100 | 3 x 15 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE901233M60060 | CR TE10020809023/60 | 9 | 3 x 150 | 3 x 22,6 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE122233M60031 | CR TE10020812023/60 | 12 | 3 x 200 | 3 x 30 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE152233M60032 | CR TE11620815023/60 | 15 | 3 x 250 | 3 x 37,6 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE182233M60186 | CR TE13620818023/60 | 18 | 3 x 300 | 3 x 45,2 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |

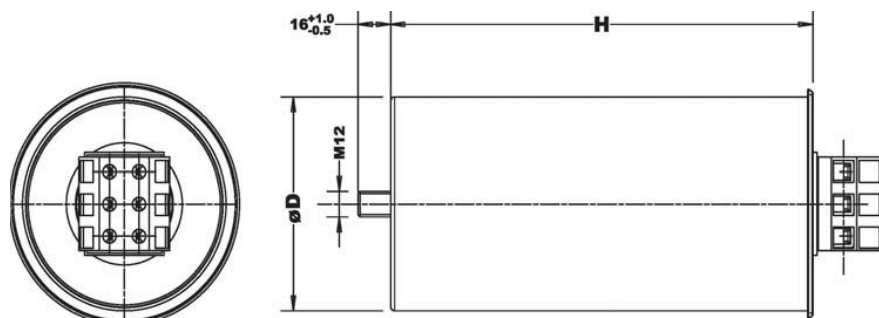
Vn = 380V - 60Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|---------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T403100156V00 | CR T-56V-1,1-380/60 | 1,1 | 3 x 6,6 | 3 x 1,7 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403150156V00 | CR T-56V-1,6-380/60 | 1,6 | 3 x 9,9 | 3 x 2,4 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403200156V00 | CR T-56V-2,2-380/60 | 2,2 | 3 x 13,3 | 3 x 3,3 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403250156V00 | CR T-56V-2,7-380/60 | 2,7 | 3 x 16,6 | 3 x 4,1 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T403300166V00 | CR T-66V-3,2-380/60 | 3,2 | 3 x 19,9 | 3 x 4,9 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T403400166V00 | CR T-66V-4,3-380/60 | 4,3 | 3 x 26,5 | 3 x 6,5 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T403500166V00 | CR T-66V-5,4-380/60 | 5,4 | 3 x 33,2 | 3 x 8,2 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE501403M50028 | CR TE07520805438/60 | 5,4 | 3 x 33,2 | 3 x 8,2 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751403M50033 | CR TE07520808138/60 | 8,1 | 3 x 49,7 | 3 x 12,3 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE102403M50053 | CR TE08520810838/60 | 10,8 | 3 x 66,3 | 3 x 16,4 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE1D2403M50036 | CR TE08520813538/60 | 13,5 | 3 x 82,9 | 3 x 20,5 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE152403M50054 | CR TE10020816238/60 | 16,2 | 3 x 99,5 | 3 x 24,6 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE202403M50001 | CR TE10020821738/60 | 21,7 | 3 x 132,6 | 3 x 33 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE252403M50002 | CR TE11620827138/60 | 27,1 | 3 x 165,8 | 3 x 41,2 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |

Vn = 480V - 60Hz

| ORDER CODE | MODEL | Q POWER (KVar) | C Capacity (µF) | In Current (A) | D Diameter (mm) | H Height (mm) | Weight (Kg) | Pcs/box | Box dimensions | Discharge resistor |
|------------------|---------------------|----------------|-----------------|----------------|-----------------|---------------|-------------|---------|----------------|--------------------|
| CR T523100156V00 | CR T-56V-1-480/60 | 1 | 3 x 3,8 | 3 x 1,2 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523150156V00 | CR T-56V-1,5-480/60 | 1,5 | 3 x 5,8 | 3 x 1,8 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523200156V00 | CR T-56V-2-480/60 | 2 | 3 x 7,7 | 3 x 2,4 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523250156V00 | CR T-56V-2,5-480/60 | 2,5 | 3 x 9,6 | 3 x 3 | 55 | 165 | 0,5 | 30 | 370x370x245 | Internal |
| CR T523300166V00 | CR T-66V-3-480/60 | 3 | 3 x 11,5 | 3 x 3,6 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T523400166V00 | CR T-66V-4-480/60 | 4 | 3 x 15,4 | 3 x 4,8 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CR T523500166V00 | CR T-66V-5-480/60 | 5 | 3 x 19,2 | 3 x 6 | 65 | 205 | 0,7 | 6 | 370x370x106 | Internal |
| CRE501483M60085 | CR TE07520805048/60 | 5 | 3 x 19,2 | 3 x 6 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE751483M60086 | CR TE07520807548/60 | 7,5 | 3 x 28,9 | 3 x 9 | 75 | 208 | 1,2 | 5 | 370x370x106 | External |
| CRE102483M60087 | CR TE08520810048/60 | 10 | 3 x 38,5 | 3 x 12 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE1D2483M60088 | CR TE08520812548/60 | 12,5 | 3 x 48,1 | 3 x 15 | 85 | 208 | 1,6 | 4 | 370x370x106 | External |
| CRE152483M60089 | CR TE10020815048/60 | 15 | 3 x 57,7 | 3 x 18 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE202483M60090 | CR TE10020820048/60 | 20 | 3 x 77 | 3 x 24,1 | 100 | 208 | 2 | 3 | 370x370x106 | External |
| CRE252483M60091 | CR TE11620825048/60 | 25 | 3 x 96,2 | 3 x 30,1 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE302483M60092 | CR TE11620830048/60 | 30 | 3 x 115,5 | 3 x 36,1 | 116 | 208 | 2,6 | 3 | 370x370x125 | External |
| CRE402523M50079 | CR TE13620840048/60 | 40 | 3 x 154 | 3 x 48,1 | 136 | 208 | 3,2 | 2 | 370x370x161 | External |

CRTE POWER CAPASITORS

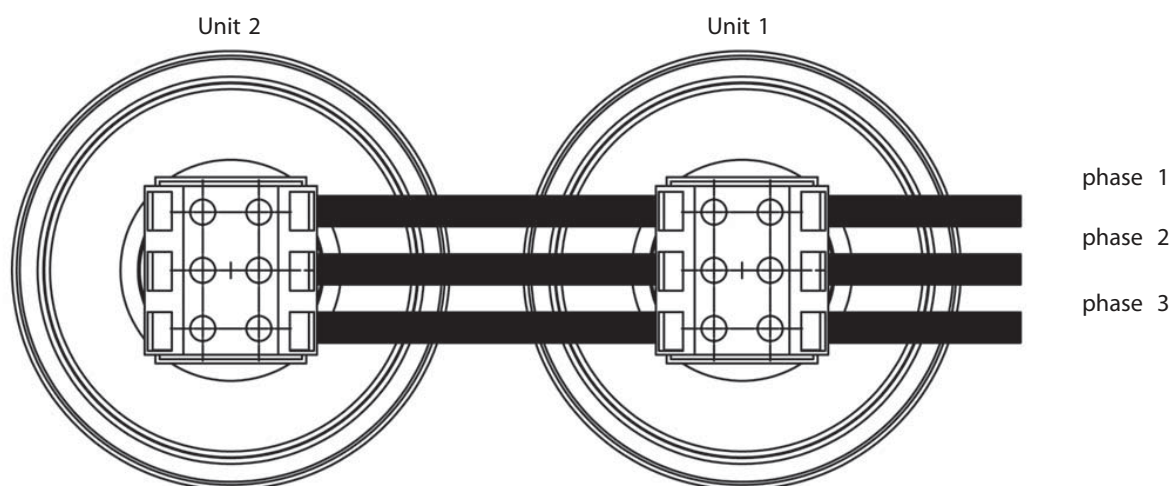


RECOMMENDED CONNECTING CABLE CROSS SECTION

| Rated voltage 415V, 50 Hz | RATED POWER | In | CR OSS SECTION |
|---------------------------|-------------|------|--------------------|
| | Qn [kvar] | [A] | mm ² Cu |
| | 2.5 | 3.5 | 2.5 |
| | 5 | 7 | 2.5 |
| | 7.5 | 10.5 | 2.5 |
| | 10 | 13.9 | 4 |
| | 12.5 | 17.4 | 4 |
| | 15 | 20.9 | 6 |
| | 20 | 27.8 | 10 |
| | 25 | 34.8 | 16 |
| | 40 | 55.6 | 25 |

The table is a guidelines for operation in normal conditions at ambient temperature up to 40°C (or 55°C capacitor sorroundig air). Various parameter such us harmonics, temperature inside the cabinet, cable length... have to be consider ed for proper selection.

LIMITS FOR PARALLEL OF CRTE CAPASITORS



The maxim um number of parallel connected units should not have a total output higher than 40kvar. The cross section of cables in the Unit 1 (phase 1, 2, 3) have to be selected considering the total amount of the Unit 1 and Unit 2 output. Lea ve enough space to allow longitudinal expansion of the can for proper operation of the internal over pressur e safety device (15 mm). A minimum space of 20 mm between capacitors is necessar y to ensure proper cooling.

INSTALLATION AND MAINTENANCE

Handling and Storage

Capacitors shall have to be handled and stored with care in order to avoid any mechanical damage during transportation. Protection against environmental influences shall also be taken.

Installation

Capacitors are suitable for indoor installation and for any mounting position. Vertical is preferable for better cooling. Capacitors must be installed in such a way that the specified limit temperature is not overcome.

Not being in compliance with the above instructions will result as a reduction of the expected service life.

Installation of capacitors shall have to be performed in such a way that any dangerous resonance phenomena due to harmonics is avoided.

Automatic power factor correction banks

The switching of a capacitor bank in parallel with energized capacitor(s), produces extremely high inrush currents and voltage transients. For this reason, it is extremely important to wait for the unit discharge before a new switching.

Assembly

Capacitors shall have to be assembled by means of the threaded M12 bottom stud. The maximum applicable tightening torque is 10Nm.

The catalogue specifies the recommended cross section of the supplying cables. The suggested tightening torque is 3Nm. With terminals screw design two antagonist spanners shall be used.

In order to ensure a proper operation of the internal overpressure safety device, an extra minimum 15mm clearance distance between the upper part of capacitors and assembly enclosures shall have to be provided.

Capacitors shall be placed in such a way that there is an adequate dissipation by convection and radiation of the heat produced by the capacitor losses. The ventilation of the operating room and the arrangement of the capacitor units shall provide good air circulation around each unit. A minimum 20mm distance between the units has to be maintained.

Maintenance

Periodical checks and inspections are required to ensure reliable operation of capacitors. Monitoring and recording of the electrical service parameters are also recommended to become acquainted with progressive capacitors stress conditions.

Protections

Capacitors shall have to be protected against inrush peak currents during switching operations of automatic banks by means of suitable contactors equipped with pre-making resistors.

SAFETY INSTRUCTIONS

DO NOT MISAPPLY CAPACITORS FOR POWER FACTOR CORRECTION APPLICATIONS

Capacitors according to the Standards, are equipped with a suitable discharge device such as discharge resistors, permanently connected. They are able to reduce the residual voltage across capacitor terminal to less than 75 V within 3 minutes or better.

DO NOT TOUCH ANY CAPACITOR TERMINAL IF NOT SHORT CIRCUITED AND EARTHED IN ADVANCE

To prevent damage to people and goods due to improper usage and/or application of capacitors, the

“RECOMMENDATION FOR THE SAFE USE OF STATIC CAPACITORS, BANKS AND EQUIPMENT FOR POWER FACTOR CORRECTION”

published by ANIE shall have to be strictly respected.

VMtec is not responsible for any kind of possible damages occurred to people or things, derived from the improper installation and application of Power Factor Correction capacitors

Most common misapplication forms

- Current, voltage, harmonics and frequency above specification;
- Working or storage temperature beyond the specified limits;
- Unusual service conditions as mechanical shock and vibrations, corrosive or abrasive conductive parts in cooling air, oil or water vapour or corrosive substances, explosive gas or dust, radioactivity, excessive and fast variations of ambient conditions, service areas higher than 2000 m above sea level...

In case of doubt in choice or in performances of the capacitors VMtec technical service MUST be contacted.

Personal Safety

Electrical or mechanical misapplications of CRTE capacitors may become hazardous. Personal injury or property damage may result from disruption of the capacitor and consequent expulsion of melted material.

Before using the capacitors in any application, please read carefully the technical information contained in this catalogue.

The energy stored in a capacitor may become lethal. The capacitor should be short circuited and earthed before handling to prevent any chance of shock.

Special attention must be taken to make sure the capacitors are correctly used for each application and that warnings and instructions are strictly followed.

Capacitors are made with polypropylene that is a flammable material. The risk of fire cannot be totally eliminated; therefore suitable precautions shall be taken. Reliability data quoted by VMtec should be considered as statistical i.e. based on a number of components, and does not guarantee properties or performance in the legal sense. VMtec liability is limited to the replacement of defective components.

This applies in particular to consequential damage caused by component failure.